

**THIS OPINION WAS NOT WRITTEN FOR PUBLICATION**

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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***Ex parte*** JACK D. AYERS

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Appeal No. 95-0112  
Application 07/787,994<sup>1</sup>

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ON BRIEF

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Before JOHN D. SMITH, ELLIS, and OWENS, ***Administrative Patent Judges***.

ELLIS, ***Administrative Patent Judge***.

**DECISION ON APPEAL**

This an appeal from the examiner's final rejection of claims 1 through 13, 31 and 34. Claims 14 through 30, 32, 33, 35 and 36 were withdrawn from consideration by the examiner under 37 CFR § 1.142(b).

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<sup>1</sup> Application for patent filed Nov. 5, 1991.

We initially note the appellant's statement that the claims stand or fall together. Brief, p. 3; 37 CFR § 1.192(c)(7). Therefore, we will limit our consideration of the issues on appeal as they apply to representative claim 1 which reads as follows:

1. A process for making superplastic steel, comprising the steps of:

rapidly solidifying molten steel to form a solidified material in the form of a powder, ribbon, foil, or flake comprising substantially single-phase austenitic steel having a grain size of no greater than about 2  $\mu\text{m}$ ;

providing said rapidly solidified material of said substantially single-phase austenitic steel having a grain size of no greater than about 2  $\mu\text{m}$ , in powder or flake form;

heating said powder or flakes of said substantially single-phase austenitic steel having a grain size of no greater than about 2  $\mu\text{m}$ , at a temperature of 300°C to 600°C, to thus transform said substantially single-phase austenitic steel powder or flakes into a superplastic steel comprising a mixture of ferrite steel and at least one metal carbide, said ferrite steel having a randomly oriented structure and having a grain size of no greater than about 2  $\mu\text{m}$ , said at least one metal carbide having a grain size no greater than about 0.5  $\mu\text{m}$ ; and

recovering said superplastic steel.

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The reference relied on by the examiner is:

Giessen et al. (Giessen)                      4,297,135                      Oct. 27, 1981

Claims 1 through 13, 31, and 34 stand rejected under  
35 U.S.C. § 103 as being unpatentable over Giessen.

We reverse.

The present invention is directed to a method of making superplastic steel.<sup>2</sup> The method comprises an initial step of rapidly solidifying molten steel into a powder, ribbon, foil, or flake having an austenitic steel structure. The rapidly solidified austenitic steel is next heated to a temperature of 300E to 600E C to produce superplastic steel which comprises a mixture of ferrite steel and at least one metal carbide.

The examiner's conclusion of obviousness is predicated on the teachings of Giessen, a patent which discloses the rapid solidification of metal alloys which are "rich in iron, nickel, cobalt and chromium," to form an ultrafine grain size. According to the examiner Giessen discloses "the features of an alloy formed by [a] rapidly solidified [sic, solidifying] process with [a] grain size, [a] dispersed particle size, and [a] heat

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<sup>2</sup> According to the appellant a "superplastic metal is a highly deformable metal that does not experience the metal fatigue that occurs upon the deformation of normal metals." Brief, p. 2, para. 2.

treatment step and [a] heat treatment temperature [which] overlap those recited by the claims." Answer, p. 3. The examiner concludes that it would have been obvious to one of ordinary skill in the metallurgical art to have selected the overlapping portion of the subject matter disclosed by the reference and to arrive at the claimed invention. Answer, p. 4, lines 2-7.

In response the appellant urges that Giessen does not teach or suggest (i) heating an austenitic steel at 300E to 600E C to transform it into a mixture of ferrite and carbide, and (ii) the formation of a superplastic steel. Brief, p. 5, para. 1.

According to the appellant,

the microstructure of Giessen et al.'s products vary with the heat treatment temperature and the specific starting composition (col. 5, lines 1 through 3). Thus, even if it were possible, it would be fortuitous if one were to select from the teachings of Giessen et al. the combination of heat treatment temperatures and starting compositions need to form the fine-grained, rounded microstructure required for superplasticity. The mere possibility of such fortuitous selection, if possible, hardly amounts to an inherent or ***prima facie*** teaching of the present invention [Brief, p. 5, para. 2].

We agree.

It is well established that the PTO bears the initial burden of establishing a ***prima facie*** case of obviousness. ***In re Fine***, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); ***In re Piasecki***, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir.

1984). The examiner must establish that the teachings of the applied prior art would have suggested the present method to a person having ordinary skill in the art, and that such persons would have had a reasonable expectation of success of preparing said compositions. *In re O'Farrell*, 853 F.2d 894, 903-904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). This suggestion must be in the prior art, and not in the applicant's disclosure. *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1532 (Fed. Cir. 1988).

In the case before us, the examiner points to the Giessen patent for teaching (i) metal alloy compositions which include, *inter alia*, alloys which are rich in iron and contain carbide (col. 2, lines 21-39), and (ii) that the alloys are heat treated at temperatures between 600E and 1100E C (col. 3, line 60). We acknowledge that alloy compositions as required by claim 1 are members of the genus of metal alloys disclosed by Giessen and that the temperature range disclosed by the patent touches on the claimed temperature range, however, from a fair reading of the patent, it is difficult for us to discern on what basis the examiner's conclusion of obviousness was reached.

In our opinion, the teachings of Giessen as to the use of metal alloys having the "formula  $M_aR_bX_c$ , where: M is one or more

of the elements iron, nickel, cobalt and chromium: R is one or more of the elements zirconium, tantalum, niobium, molybdenum, tungsten, titanium, and vanadium; and X is one or more of the elements boron, silicon and carbons,"<sup>3</sup> does not reasonably suggest an alloy which, (when heated between 300E-600E C), will produce a superplastic steel comprising a mixture of ferrite steel having a randomly oriented structure and a grain size no greater than about 2Fm and at least one metal carbide having a grain size no greater than about 0.5Fm as required by claim 1. We find no reason based on the teachings of Giessen as to why one of ordinary skill in the metallurgical art would have been motivated to select an austenitic steel as required by claim 1, and no reasons have been provided by the examiner.

Similarly, in our view, the temperature range of 600E to 1100E C disclosed by Giessen would have suggested to those of ordinary skill in this art, the heating of the metal alloys at temperatures greater than 600E C. That is, given the disclosed range which produces metals having the desired characteristics of high hardness, high tensile strength, good ductility and high

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<sup>3</sup> Giessen, col. 2, lines 21-29.

thermal stability,<sup>4</sup> one skilled in the art would have no reason to maintain the temperature of the heat treatment at the minimum 600E C temperature, which according to claim 1 is essential in order to produce a superplastic steel. Although the examiner urges us to believe that one of ordinary skill in the metallurgical art would have been motivated to select a heat treatment temperature of 600E C from the disclosed range of 600E to 1100E C, he has given us no reasons based on the teachings of Giessen, or knowledge generally available in the art, as to why one would have done so.

Thus, on this record, the only thread we find which ties together all the essential alloy components and the temperature range required by claim 1 is the appellant's disclosure. The examiner has not begun to establish that based on the teachings of the prior art, one of ordinary skill in the art would have found it obvious to select the claimed components and temperature range in order to produce superplastic steel. In our opinion the examiner has relied on "hindsight" to arrive at the conclusion that the present invention is obvious over the prior art. ***In re Fritch***, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir.

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<sup>4</sup>Giessen, col. 4, lines 8-11.

1992); **Interconnect Planning Corp. v. Feil**, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed. Cir. 1985) ("It is impermissible to engage in hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from references to fill the gaps.")

As a final note, we appreciate the examiner's concerns that there may be no difference between the claimed superplastic steel and the steel produced using the method disclosed by Giessen. **In re Best**, 562 F.2d 1252, 1255, 195 USPQ 430, 433-434 (CCPA 1977) (Where the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product). However, in the case before us, Giessen does not even mention superplastic steel and the examiner has not established that the product made from the process described in col. 4, lines 8-11, of the patent is, in fact, a superplastic steel. As pointed out by the appellant, it would be fortuitous if one happened to select the proper starting alloy and maintain the heat treatment at the minimum temperature of 600E C (and not 1E C more) and, thus, produce the product described in claim 1. We



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agree and caution the examiner that inherency must be based on inevitability, not speculation. *In re Oelrich*, 666 F.2d 578, 581-582, 212 USPQ 323, 326 (CCPA 1981). Since the examiner has not given any reasons as to why the teachings of Giessen would have suggested the components, conditions and resultant superplastic steel as described in claim 1, we find the examiner's conclusion that the "superplastic property would have been inherent"<sup>5</sup> to be based on speculation.

Accordingly, the decision of the examiner is reversed.

**REVERSED**

JOHN D. SMITH	)	
Administrative Patent Judge)	)	
	)	
	)	
JOAN ELLIS	)	BOARD OF PATENT
Administrative Patent Judge)	)	APPEALS AND
	)	INTERFERENCES
	)	
TERRY J. OWENS	)	
Administrative Patent Judge)	)	

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<sup>5</sup> Answer, p. 5, para. 1.

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APPEAL NO. 95-0112 - JUDGE ELLIS

APPLICATION NO. 07/787,994

APJ ELLIS

APJ JOHN SMITH

APJ OWENS

DECISION: **REVERSED**

Typed By: Jenine Gillis

**DRAFT TYPED:** 11 AUG 97

Revision: 12 AUG 97

**FINAL TYPED:**